W524b 630.8 W524l no. 92

Poison Plants of Western Australia.

LEAFLET No. 92.

Issued by authority of HON. H. K. MALEY, Minister for Agriculture.

Owing to the numerous requests received from time to time from various parts of the State with reference to Native Poison Plants, and the treatment of stock poisoned thereby, it has been thought desirable to issue the following statement for the information of settlers, which summarises the information at present available on this important subject.

THE PRINCIPAL SPECIES.

There are two principal groups or genera of Poison Plants in Western Australia, namely *Gastrolobium* and *Oxylobium*. York Road Poison, which is botanically known as *Gastrolobium calycinum*, is perhaps the best known example of the first group, and Box Poison, scientifically called *Oxylobium parviflorum*, is the most commonly occurring member of the second group.

Many of our poisonous plants are closely related and belong to one or other of these two groups. The following is a list of the principal members of each, together with the vernacular names (where known) that are usually applied to them.

Unfortunately there is little uniformity in the application of the vernacular names. The same plant may be known under several common names in as many different localities, and the same varnacular name is frequently used to denote two quite dissimilar plants.

In the following list, the vernacular names which have the widest application have been selected, and an endeavour will be made to render the practice in this respect uniform.

GASTROLOBIUM.

Botanical Name.	*Vernacular Name.*
Gastrolobium bidens	Kite Leaf Poison.
Gastrolobium bilobum	Heart Leaf Poison.
Gastrolobium callistachys	Rock Poison.
Gastrolobium calycinum	York Road Poison.
Gastrolobium crassifolium	Narrow Leaf Poison.
Gastrolobium grandiflorum	Desert Poison.
Gastrolobium hamulosum	Hook Pointed Poison.
Gastrolobium ovalifolium	Runner Poison.
Gastrolobium oxylobioides	Champion Bay Poison, Sand Plain Poison.
Gastrolobium parvifolium	Berry poison.
Gastrolobium spinosum	Prickly Poison.
Gastrolobium trilobum	Bullock Poison.
Gastrolobium villosum	Crimp Leaf Poison.

OXYLOBIUM.

Oxylobium parviflorum—Box Poison.
Oxylobium retusum—Bloom Poison.

IDENTIFICATION OF POISONOUS SPECIES.

All *Oxylobiums* and *Gastrolobiums* agree in having pea-shaped flowers, which produce small pods containing two or more dark-coloured seeds. In all other conspicuous features they differ widely amongst themselves. Some are small plants, rarely exceeding six inches in height, whilst others may attain the dimensions of a small tree.

Their leaves exhibit similar wide variations in size, form, texture, and presence or absence of spines, etc. Thus, it is impossible to give simple non-technical characteristic features, which will serve as an easy guide to the recognition of the poisonous plants.

Not infrequently it is said that shrubs with opposite leaves and prickles, plants with slimy leaves, or plants with pods and pea-shaped flowers are poisonous. Such simple guides may be useful and reliable in certain localities, where only one or two species having these particular characteristics exist. Generalisations of this sort, however, will involve an element of risk and not infrequently stigmatise many perfectly harmless plants.

All suspected plants may be forwarded to the Department for identification, and to facilitate this work, the specimens should include flowers and pods.

NATURE OF THE POISONOUS PRINCIPLES.

The members of both these genera, *Gastrolobium* and *Oxylobium* have had a more or less sinister reputation for many years, but the actual cause of their deleterious effect on stock baffled investigators both in Australia and in Europe until 1905, when investigations conducted in the Government Laboratory in Perth at length revealed the nature of the poisons. Both in York Road Poison and Box Poison certain alkaloids were discovered hitherto unknown to science. [A full account of these investigations was published in certain progress reports issued by the Department of Agriculture, entitled "The Examination of Western Australian Poison Plants."]

The poisons found in these two typical poison plants were investigated, and it was found that although they were highly dangerous substances, and readily extracted from the leaves of the plants by the action of the gastric juices in the stomach, they were very easily decomposed. This property suggested the following ready means of treating affected stock.

Although every plant included in above lists has not been individually proved to be poisonous, the information which has been collected is sufficient to justify every member of these two groups being considered dangerous to stock.

THE ANTIDOTE.

The Government Analyst adapted to the local requirements, the method employed in America of dealing with "loco" poison, and suggested the use of tabloids composed of a mixture of permanganate of potassium and sulphate of aluminium. The object of the latter ingredient is to insure the production of an acid condition of the stomach, a condition favouring the rapid and complete decomposition of the alkaloids by the potassium permanganate. The manufacture of these tabloids was undertaken on behalf of the Government by Messrs. Felton, Grimwade, & Bickford, of Perth, and communications for supplies should be sent to that firm.

Although permanganate of potash alone may often be effective it is not likely to be so reliable as the official tabloid antidote. When supplies of the tabloids are not at hand, 10 grains of permanganate (which would be as much as would lie comfortably on a sixpence) may be substituted for each tabloid required. Care should be taken to get all the permanganate into solution, as undissolved crystals are apt to cause severe irritation to the throat.

TREATMENT.

The following is a copy of the recommendations made in 1906, and repeated in the *Journal of the Department of Agriculture* for May, 1907.

As soon as the symptoms of poison have been detected or if poisoning is suspected, one or more tabloids of the antidote should be crushed, dissolved in water, and administered as a drench. The water must be sufficient for drenching, and may vary from a pint to a quart, or even more, according to the animal and the dose.

Great care must be taken that the substance is completely dissolved. Small crystals are apt to remain undissolved, and may be overlooked in the dark-coloured liquid. If swallowed they may stick to the walls of the throat or stomach, cause intense irritation, and may kill the animal. This is the only danger in the use of this antidote. If completely dissolved it is harmless, and can be administered with perfect safety, even if poisoning is only suspected.

The following doses for animals are suggested—they may be exceeded slightly with safety:—

For sheep—One tabloid.
For pigs—One tabloid.
For horses—One and a-half to two tabloids.
For cattle—Three to five tabloids.

The above doses are for adults. For young animals the doses should be made proportionately smaller.

If after administration of first dose the symptoms return or increase, half doses may be given at intervals of, say, half an hour. The animal should be kept as quiet as possible, any excitement will assist the absorption of the poison, and decrease the chances of recovery.

Note.—This antidote has been practically proved efficacious with the York Road Poison, and is also suitable for Box Poison. With other plants sufficient experiments have no tyet been made, and the result cannot be vouched for. It is highly probable, however, that the antidote will be effective in all cases, and it can be used with safety.

This treatment has been tried in a great many cases, and has proved very efficacious, and a large number of stock have already been saved. The lesson to be learnt is that every settler should be prepared with means readily available to treat poisoned stock according to the above method, and that plants belonging to these genera should be exterminated by every possible means. It is believed that the plants are more poisonous at some seasons of the year than at others, but this has not been definitely established by scientific investigations, and it would seem a sounder and safer policy to treat them as poisonous at all times of the year, and since prevention is better than cure, to use every endeavour to eradicate the plants rather than to rely upon saving stock by treatment after they have been poisoned.

OTHER POISON PLANTS.

In addition to plants belonging to genera *Gastrolobium* and *Oxylobium* there are a number of others, the poisonous principles of which have not been investigated, so that an antidote is not known. The success of permanganate of potash in the case of other poison plants suggests that its use may be beneficial in these cases; it can certainly do no harm when used in the proportions given above. These species are Lamb Poison (*Isotropis striata, I. Drummondii,* and *I. juncea*), Balsam (*Euphorbia Drummondii*), and Blind Grass (*Stypandra glauca*). In the Pituri (*Duboisia hopwoodii*) of the goldfields the poisonous principle is nicotine.

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no. 93

Western Australia.

DEPARTMENT OF AGRICULTURE.

LEAFLET No. 93.

The Home Tanning of Sheep and other Skins.

By

H. SALT, B.Sc., A.I.C., Leather Chemist, Commonwealth Forests Products Laboratory.

PERTH:

BY AUTHORITY: FRED. WM. SIMPSON, GOVERNMENT PRINTER.

1921.

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FOREWORD.

Many farmers endeavour to tan sheep and other skins for home use, and as there appears to be a lack of definite and instructive information available on the subject, Mr. H. Salt, B.Sc., A.I.C., Leather Chemist, Commonwealth Forests Products Laboratory, has at my request furnished some useful particulars as to the best and most successful methods to adopt. His prompt and valuable assistance in the matter is hereby acknowledged with thanks.

In view of the usefulness of these notes, the Minister for Agriculture (The Hon. H. K. Maley, M.L.A.), decided to have the following details published for the information of interested settlers.

GEO. L. SUTTON,
Director of Agriculture.

THE HOME TANNING OF SHEEP AND OTHER SKINS.

H. SALT, B.Sc., A.I.C.

1. The skins should first be made as clean as possible. Dried skins must be soaked in water for two days or more until just as soft as fresh skins.

All the fat and loose skin on the flesh side (*i.e.*, inside) must be scraped off, because the greasier the skin, the slower the penetration of the tanning liquors.

Boil a few ounces of soap with water, and when dissolved make up to about a gallon of cold water. Use the solution *cold* to wash dirt and grease from the skin and wool. A few drops of phenyle or other carbolic disinfectant is useful in the washing water. When the skin is clean enough remove all trace of soap by rinsing.

2. Dissolve 1lb. alum and ½lb. salt in two gallons of water. Dissolve 1oz. (no more) of soda in a pint of water, and add to the first solution. Stir well for five minutes.

Soak the cleaned skins in the liquor for at least one week. Thick skins and greasy skins will take several days longer. It is always best to allow plenty of time for tanning, because over-tanning is improbable, but under-tanning might easily result. If the tanning vessel is big enough, lay the skins out on the bottom, but if they must be doubled up whilst tanning, move them at least twice a day. This prevents uneven tanning.

If desired chrome alum can be used instead of ordinary alum. Chrome alum is the more expensive, but has the advantage that the tanned skin will stand much more washing, and is generally better.

3. When the skins are tanned through (a little cut in the neck should be the same colour right through) wash them once in cold water. Too much washing is not advisable, but the alum is best removed from the wool. Let them drain over a pole with the wool outside for a few hours till they feel thoroughly damp, but not wet. Then nail them on a board, stretching them out as flat as possible. The better the stretching in drying, the easier is the working up afterwards.

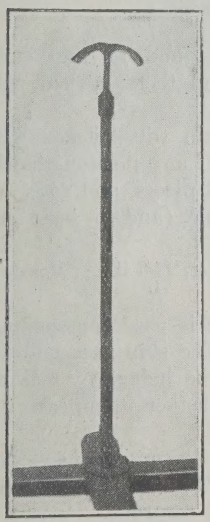

Fig. 1.—A small staker.

If a slight greasiness and smell does not matter in the finished rug, rub a little *soft grease* or Neatsfoot oil over the flesh side before nailing out to dry.

When quite dry leave the skins a week or two so that the tannage can mature.

4. The great secret of making a soft alum leather is in working it up well after drying. For this purpose a staking tool can be made of a piece of metal (or perhaps hardwood). This is shaped as shown in Fig. 1. The edge is blunt; an old axe head with blunt edge and rounded corners will serve quite well. An axe mounted for

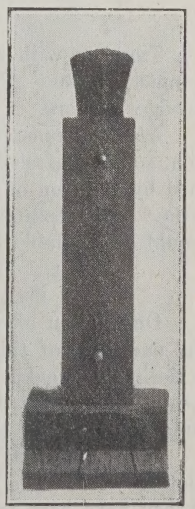

Fig. 2.—A staker made from an axe head.

this purpose is shown in Fig. 2. The top of the axe should be about three feet from the ground.

To soften them, the skins are pulled over this edge as shown on *frontispiece.* A considerable amount of pressure can be used.

If the skins are damped on the flesh side with a little water to soften them, they will stake very much easier. Very little moisture is needed for this purpose, and some preliminary softening can be given by working with the hands.

Unless the loose tissue has been scraped off well before tanning, the staking will raise the flesh side. If the loose flesh has not been removed before tanning, this can be done now by rubbing with pumice-stone, or by gently pressing the skin to a quick-moving grindstone. A better method than the former, and safer than the latter, is to throw the skin over a pole and scrape it with a round tin lid (the lid of a tobacco tin will serve, but a larger one will work the skins quicker). Scraping must be done with judgment.

The skins should now be soft, and the flesh side fairly smooth. The wool can be combed or brushed, and, as a final finish, a narrow strip can be cut all round the skin, since the edges are often difficult to soften.

When mats of this nature are washed they sometimes dry hard. A little staking will always soften them.

Points to remember:—

1. The wool on a fresh skin is more likely to be firm than the wool on a skin which has been kept some time;
2. If the wool needs washing, do it before tanning.
3. Give the skins plenty of time for tanning, and do not forget to turn them.
4. If there is a horny streak in the middle of the dry leather, the skin is not fully tanned.
5. Pliable leather is obtained by working the skins after tanning. A damp skin is easiest to soften.

BARK TANNAGE.

Tannage with bark is not very easy in rough conditions, and, on the whole, is much slower. The skins are best lightly tanned first, and then finished with stronger liquors.

All iron must be avoided, if possible, because the tannin will blacken with iron, so that, after drying the bark, it is advisable to break off any portions blackened by the iron of the axe. Break up the dry bark in small pieces, and soak for a day. The following quantities may be found very suitable (and at least one should be available in most parts of the State):—

Mallet, 1 lb.; Wattle, 1½ lbs.; Mallee, 2½ lbs.; Gimlet, 1½ lbs.; Wandoo, 2 lbs.; Jam, 5 lbs.

One gallon of water to the amount of bark given above is used for soaking, and one-third of this is added to a gallon of fresh water. The skins are allowed to lie in this weaker solution until tanned through. This can be judged by making a small cut in the thickest part of the skin, and observing whether it appears the same colour right throughout.

When this first tannage is complete add the rest of the liquor, and leave for another week. The skins can be finished off as for the alum tannage if hard, but if they have been tanned through they should be soft enough for rugs.

The quantities of bark are, of course, approximate, and must be varied according to the amount of liquor required. If several skins are to be tanned in succession, the old liquor from one lot will serve as the first liquor for the next lot, strengthening up after the cut shows an even colour. A liquor should improve with constant use up to the third or fourth time.

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WESTERN AUSTRALIA.

DEPARTMENT OF AGRICULTURE.

LEAFLET NO. 95.

Poultry Stickfast Flea

(*Echidnophaga Gallinacea*).

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JUL 9 1925

Warning to Poultry-keepers.

By

L. J. NEWMAN, Entomologist, and
GEO. ALLMAN, Government Poultry Expert.

The dark portions and specks in above photo are Stickfast Flea thickly embedded in the head, lobes, and wattles of the fowl.

PERTH:

BY AUTHORITY: FRED. WM. SIMPSON, GOVERNMENT PRINTER.

1923.

P9278/23.

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POULTRY STICKFAST FLEA.

By

L. J. NEWMAN, Entomologist, and

GEO. ALLMAN, Government Poultry Expert.

Owing to the prevailing apathy displayed by the general public towards the spread of the flea, we deem it advisable to stress the urgency of combined preventive and combative action. Climate, together with the sandy nature of the metropolitan areas, make ideal conditions for the propagation of this pest. The public have been notified through the Press of its nature and preventive and remedial treatments.

In spite of repeated warnings, however, we find that many of the public are paying little heed, and thus the flea is spreading throughout the country.

There are several serious aspects concerning the flea, which we wish noted:—

1. **The Poultry Industry**, one of no mean importance, is threatened with a serious set-back.

2. **Our native birds** are likely to become infested with the flea and thus further reduce their already diminishing numbers, and as a result of this unbalancing of nature we permit the undue increase of insect pests.

3. **Domestic Animals**, such as cats, dogs, etc., are being attacked, and per medium of these, the houses and homes of the people are being infested.

4. **Other Animals** found to harbour this flea locally are the horse, kangaroo, and rats, and the following birds:—Poultry, magpies, parrots, cockatoos, and owls.

5. There is every possibility of this flea becoming a conveyer of disease between animal and animal and to human beings. It is found infesting rats, and the fact that there are known to exist several species of flea that are proved plague carriers suggests that the "Stickfast" flea may be an addition to this list, and therefore a possible serious danger in this direction.

6. **Unless combined action is taken**, we fear that the outbreak may assume very serious proportions, and not only will the poultry industry suffer, but the life of the community may be seriously disturbed by the appearance of swarms of fleas in the yards and homes of the people.

LIFE PHASES.

It is not generally recognised that the flea has any other period than the adult hopper stage. There are four distinct changes during the life of a flea, namely: egg, larva or maggot, pupa (enveloped in small white cocoon), and imago or adult hopper. It is, however, only in the adult stage that it becomes a blood-sucking parasite on animals. When ready, the female drops or lays her eggs amongst the bird droppings or other organic matter. From these tiny oval white eggs, there quickly batches the maggots. The maggots feed upon the organic matter in the soil, which is mainly supplied by the bird excreta or droppings and excreta of the parent fleas.

The maggots crawl into cracks and crevices or any suitable shady location, and continue to feed and grow. When mature, they burrow from three to six inches into the soil and spin their cocoons, within which they pupate, finally emerging as the adult hoppers.

HABITS.

The adult flea hops on to its host and pushes or inserts its rostrum or beak through the skin, engorging itself with blood.

This beak is so constructed that it gives the characteristic hold, rendering it difficult to dislodge—hence the name "Stickfast."

It always selects those parts of its victim or host that are free of feathers or hair.

Another peculiar feature is the fact that it does not run over the body like other fleas but remains congregated in masses.

On poultry and birds, it is mostly found on the comb, wattles, and lobes and around the eyes.

On dogs, cats and other domestic animals, about the ears, nose, eyelids, and between the toes.

On horses, about the fetlocks and around the mouth and nostrils.

TREATMENT.

Knowing that the pre-adult stages of the flea are found in the organic matter in the soil, we strongly recommend that approved killing solutions be applied. By this treatment, the pest is largely destroyed before it reaches the annoying and dangerous adult hopper stage.

The most economic and effective of the ground insecticides used against this flea is a 10 per cent. solution **(1 lb. to 1 gallon of water)** of common salt. This should be applied at regular intervals of 14 to 16 days, seeing that the yards—after cleaning up—are well saturated to a depth of six inches.

Before the next treatment, dig over the premises to a depth of at least six inches and again apply the salt solution.

This method of treatment should be continued until the flea has been exterminated. To do it once or twice and then allow the accumulation of dirt and other suitable flea-breeding conditions means courting further trouble. It is only by consistent and co-operative effort that the pest can be exterminated or kept in control.

The 10 per cent. salt solution cannot be used on areas where plants or shallow-rooting trees are growing, as it will eventually kill them. Under the average fowl-yard conditions, however, little or no plant growth is found.

Where it is possible to apply water to the yards per medium of a hose, the salt may be distributed broadcast and thoroughly watered in. Give a liberal dressing, taking care to see that all the salt is washed into the soil. Any salt left lying on the surface of the ground is liable to be picked up by the poultry, resulting in their death.

There are many commercial disinfectants and vermin destroyers on the market, which, if applied to the soil according to their formulæ, will act in a similar manner.

The process of soil saturation with an insecticide, if continued during the winter months, will largely prevent a recrudescence of the flea, in the early summer, by destroying the hibernating stages.

At any season of the year, wet conditions of soil act as a check upon this pest.

Treatment of Flea on Birds and Animals.—After exhaustive experiments, we have proved that the most successful method is the application of any non-burning oils, such as castor or salad oil, vaseline, etc.

The oils are applied to those parts of the bird or animal where the fleas have congregated or massed.

The death of the flea by the use of oils or grease is due to the stuffing up of the insect's breathing spiracles, and does not, in any way, distress the bird or animal.

The treatment to be effective, therefore, must be thorough, seeing that all the fleas are covered with the preparation.

On animals—in addition to the use of oils—any proved commercial dips, as per their formulæ, may be applied to the affected parts.

If animals and birds have been freed of the flea during the warmer parts of the season, they will usually remain clean throughout the winter months. June to September.

Birds or animals not cleared of the flea before winter and allowed to remain untreated, have proved carriers of the hoppers from autumn to early summer. This is proof of the necessity for making every effort, to not only kill the hibernating stages in the soil, but also the few or occasional adults found on cats, dogs, and poultry during winter.

Overcrowding of Poultry Yards.—This is a common fault. Birds of all ages are mixed together; such conditions should be avoided as they greatly encourage the breeding of the flea. Avoid the yarding of fowls and ducks together, as it is difficult under such conditions to keep the premises clean. Dirty yards make ideal breeding places for the flea.

Feeding and Condition of Poultry.—Poultry should be systematically fed and kept in good condition. It has been proved that underfed weakly birds are especially susceptible to the flea, and always the first attacked.

Sitting or Broody Hens.—Keep a sharp eye on these birds, as owing to their condition they are especially liable to attack. On the first appearance of flea, treat the birds and thoroughly cleanse the nest and surroundings. If this is not done promptly, the bird will become badly infested and the chickens, in turn, may be killed by the swarms of fleas.

Do not purchase poultry from infested yards.

Carefully examine all birds before liberating in yards.

Allow no strange birds, dogs, cats, etc., entrance to poultry yards, as they constitute carriers of the pest.

All crates in which birds have been carried to be thoroughly disinfected.

Birds must be confined to yard whilst undergoing treatment.

Dropping Trays.—It has been found effective in the control of this pest to place under the perches or roosts, sheets of iron or other suitable material to

catch the droppings. These droppings should be removed daily and dug into the garden deeply, or they may be converted into liquid manure, or otherwise destroyed by fire.

For the treatment of poultry-houses, fences, etc., to do this work properly, a good force pump with hose is necessary, so that every crack and crevice in the fowlhouse, fence, etc., can be reached with any approved insecticide. A syringe may be used, but is much slower and less effective.

A good spray is made as follows:—

Boil ½lb. of soap in 1 gallon of water. When boiling remove from fire and at once add 2 gallons of kerosene. Stir violently for 10 minutes, until the whole forms a creamy mass, which thickens on cooling. This is known as the "stock" solution. When using, to one part of "stock" add 8 to 10 parts of water (hot preferred). The addition of a little naphthaline dissolved in the kerosene is recommended. There are ready-made vermin destroyers and insecticides on the market which, if used thoroughly, will give good results.

SUMMARY.

1. Treatment of yards as outlined.

2. Practise complete cleanliness, both summer and winter, by keeping the yard and houses free of droppings and rubbish at all times.

3. The treatment of infested birds and animals as recommended.

4. The destruction of neglected dogs, cats, and other animals or birds carrying the pest.

5. Keep yards at all times as moist as possible.

In conclusion, the Department has proved that the commercial poultry farmers can keep their flocks free of the pest by giving the necessary care and attention. It therefore behoves the non-commercial and backyard keepers to heartily co-operate in the efforts being made to control this very serious pest, by the use and application of the before mentioned preventive and remedial treatments.

By Authority: Fred. Wm. Simpson, Government Printer, Perth.

W624

Leaflet No. 102.

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no. 102

Western Australia.

DEPARTMENT OF AGRICULTURE.

The Director of Agriculture (Mr. G. L. Sutton) has made available the following information which has been prepared by the Wheat Experimentalist (Mr. F. Vanzetti) from the results obtained at the Merredin Experiment Farm:—

A DRY TREATMENT OF SMUT INFECTED SEED.

The dry treatment of smut infected seed wheat with **Dry Copper Carbonate** has emerged from the experimental stage with results of consistent excellency, and its advantages over the laborious wet pickling with Bluestone (Copper sulphate) are so many that farmers will readily welcome this modern discovery of science. The results appended herewith have been abridged and tabulated with a view of comparing the results obtained by a simultaneous test of various fungicides. It will be seen therefrom that **the dry treatment with Copper Carbonate was most effective not only in preventing the development of smut in the plant, but also in leaving undisturbed the natural development of the plants.**

The standard rate of Copper Carbonate to use is at the rate of 2oz. per bushel of wheat, and the success of the treatment depends to a large extent upon the thorough mixing of the fungicide with the seed wheat. The Copper Carbonate dust adheres well to the grain, but it is not sufficient to sprinkle 2ozs. over each bushel of wheat in the grain box of the drill, as this will not have the desired effect. Farmers who intend using this fungicide must also be cautious in handling the Copper Carbonate, as the dust arising, if inhaled during the process of mixing it with the wheat, is very injurious to the operator.

MERREDIN EXPERIMENT FARM.

Results of Fungicide Tests for the 1922 *Season.*

Treatment of Seed.	Percentage of seed germinated.	Plants died during growth.	Plants matured.	Percental Results.	
				Smutted Plants.	Clean Plants.
1. Clean seed, not smut infected and not treated in any way.	82	6	76	0	100
2. Smut infected seed, treated with Dry Copper Carbonate (2oz. to the bushel).	68	0	68	0	100
3. Smut infected seed, treated with Wet Pickling Bluestone 1½ per ent. solution.	53	7	46	1	99
4. Smut infected seed, treated with Wet Pickling Bluestone 1½ per cent. solution and Lime Water.	68	11	57	2	98
5. Smut infected seed, treated with Dry Copper Carbonate (2ozs. to the bushel) and reinfected.*	67	3	64	31	69
6. Smut infected seed, treated with Dry Powdered Bluestone (2ozs. to th bushel).	92	7	85	33	67
7. Smut infected seed, treated with Dry Powdered Bluestone, and dusted with Dry Slacked Lime.	92	7	85	44	56
8. Smut infected seed, not treated in any way.	82	10	72	77	23

* The artificially infected seed in both the first instance and in the re-infection, represents a very extreme test, far worse than would ever be met under any farm conditions. The ather high percentage of smutted plants in test No. 5 is believed to be due to the small quantity of copper carbonate applied in the first instance not being sufficient to deal with the subsequent additi nal smut infection.

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no. 103

Western Australia.

DEPARTMENT OF AGRICULTURE.

The Kerosene Method for Eradicating the Zamia Palm.

By G. K. BARON-HAY B.Sc. (Agriculture),
Agricultural Adviser.

Fig. II.—Pouring in the Voco Kerosene.

Issued by the direction of
The HON. H. K. MALEY, Minister for Agriculture.

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p. 9718.

THE KEROSENE METHOD FOR ERADICATING THE ZAMIA PALM.

[By G. K. Baron-Hay B.Sc. (Agriculture),

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The common ZAMIA PALM (*Macrozamia Fraseri*) is growing profusely throughout the coastal areas of the South-West of this State, and is a serious menace to cattle, as they frequently eat it and, in consequence, become paralysed in the hind legs—a complaint commonly known as "rickets." As numbers of cattle have died from this cause, any method which will facilitate its destruction is sure to prove of interest to those having Zamia Palm on their holdings. Recently, Mr. G. B. Mitchell, of Harvey, drew attention to an easy and simple method of destruction by means of power or "Voco Kerosene." The idea is as simple as it is effective, and only necessitates the pouring of two or three ounces of "Voco Kerosene" into the centre of each Zamia Palm. Twenty-four hours after this application, the leaves of the palm may be easily pulled out, leaving a hole in the centre of the boll, which is found at the base of the leaves, just below the ground. The boll will be found to rot away later, especially if the

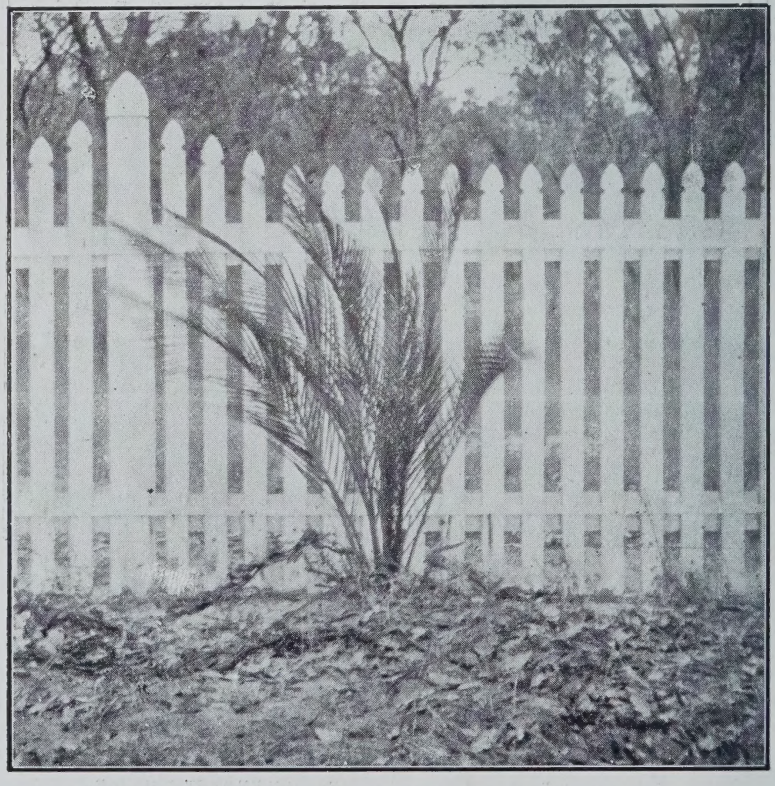

Fig. I.—Before treatment.

work is done in the winter. The leaves, after being pulled out, should be gathered into heaps and burned to prevent their being eaten by the cattle. To avoid treating any palm more than once—which is easily done in bush country—a little whiting can be mixed with the kerosene, which will then clearly show those palms which have been treated ; or else a leaf in each palm can be bent down at its midpoint. It has been found that a two-ounce dose is ample, and as effective as any larger dose. The cost of oil for this treatment has been estimated to be about one farthing ($\frac{1}{4}$d.) per plant. The effectiveness of this method is shown by the illustrations of a demonstration conducted at Claremont by Mr. Hack and the writer.

Fig. I shows the palm before treatment.

Fig. II. *Frontispiece.* The "Voco Kerosene" being poured into the centre of the plant.

Fig. III. The removal of the leaves 24 hours afterwards.

Fig. III.—24 hours after treatment.

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